

**TRANSMIT DIVERSITY AND SPATIAL SPREADING FOR  
AN OFDM-BASED MULTI-ANTENNA COMMUNICATION SYSTEM**

**ABSTRACT**

A multi-antenna transmitting entity transmits data to a single- or multi-antenna receiving entity using (1) a steered mode to direct the data transmission toward the receiving entity or (2) a pseudo-random transmit steering (PRTS) mode to randomize the effective channels observed by the data transmission across the subbands. The PRTS mode may be used to achieve transmit diversity or spatial spreading. For transmit diversity, the transmitting entity uses different pseudo-random steering vectors across the subbands but the same steering vector across an entire packet for each subband. The receiving entity does not need to have knowledge of the pseudo-random steering vectors or perform any special processing. For spatial spreading, the transmitting entity uses different pseudo-random steering vectors across the subbands and different steering vectors across the packet for each subband. Only the transmitting and receiving entities know the steering vectors used for data transmission.